
VDOT
Virginia Department of Transportation

STANDARDS & SPECIFICATIONS: SIGNS

November 18, 2019 – Thornburg

Specifications

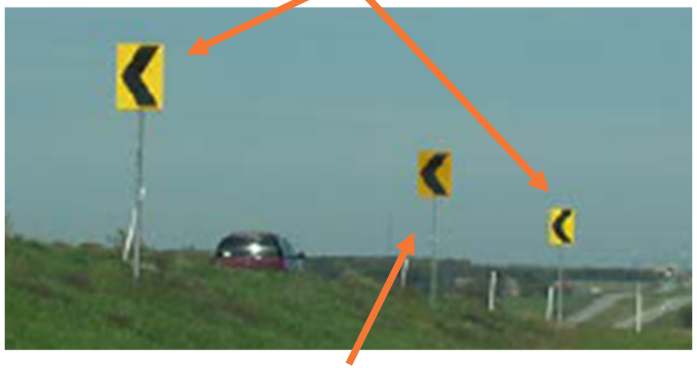
- Section 701: Overlay panels can only be on flat surface
  - Designers be aware, not all signs can be overlaid!
  - Check for existing bolt heads
  - Stay tuned for potential additional policy regarding loading impacts of overlays.

Overlay Panel

Specifications: Sign Color

- Section 247: Fluorescent colors
  - W1-series signs: fluorescent yellow
  - Bike/ped/school: fluorescent yellow-green
  - Construction signs: fluorescent orange

Fluorescent Yellow Chevrons



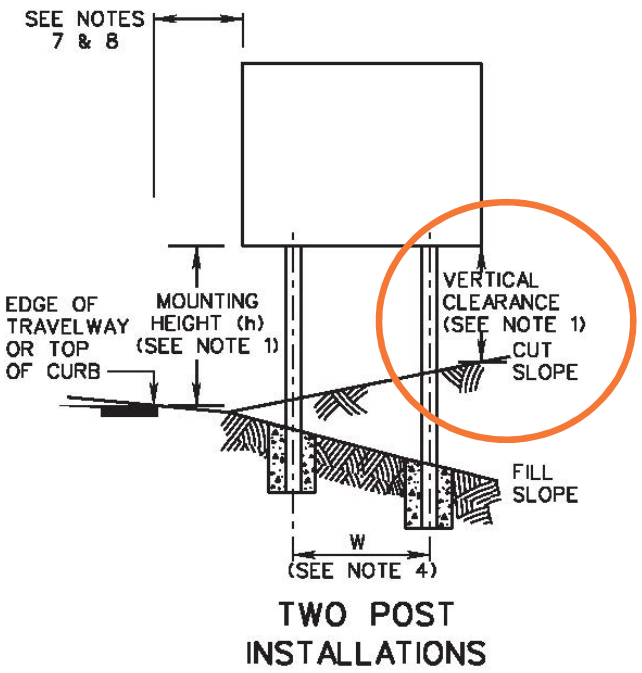
Standard Yellow Chevron

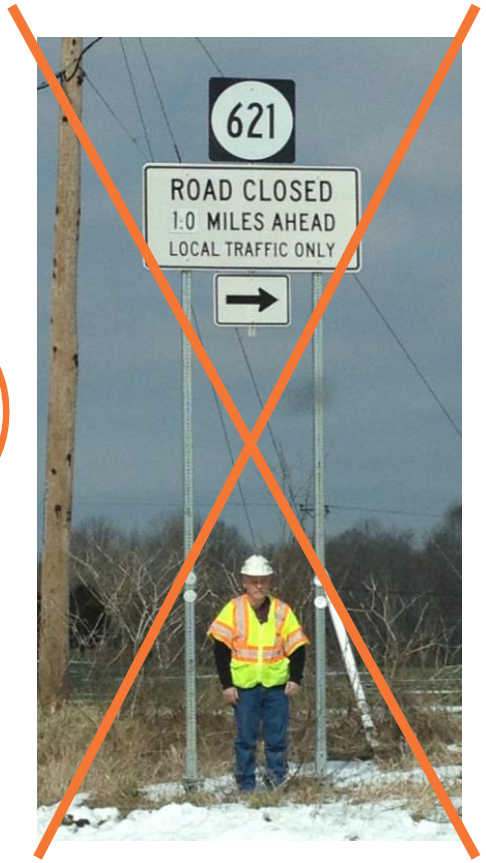
Sign Structure Types

Type	Description	Comments
STP-1	2” or 2.5” square tube sign post	For smaller- or standard-sized signs
STP-2	4” square tube sign post	For larger sign panel sizes; centroid & square footage limited
SSP-VA	Single post I-beam	For smaller- or standard-sized signs. Typically installed on freeways and limited access facilities. Prefer placement behind barrier or on up-slope.
SSP-VIA	2-3 post I-beam	For ground-mounted large format signs. Prefer placement behind barrier or on up-slope.
WSP-1	Wood Post	For temporary installations
OSS-1	Overhead sign structure	For overhead large format signs

Sign Post Mounting Height

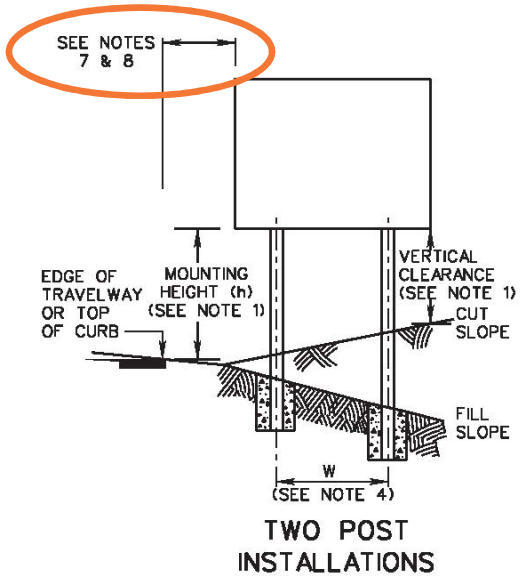
- Measured from edge of travelway or top of curb
- Minimum vertical clearance above cut slopes
- 8’ maximum mounting height





Sign Post Lateral Placement

- Near edge of sign shall be at least:
  - 2’ behind face of curb,
  - 4’ behind face of concrete barrier, and
  - Beyond guardrail’s deflection distance.
    - Deflection distance for new MGS guardrail standards has increased!



STP-1 Square Tube Sign Post: Design Table

- Designers should always round up when selecting the centroid locations
- Each sign type lists which foundations can be used

TABLE 2
FOR BRISTOL, SALEM, LYNCHBURG, RICHMOND, FREDERICKSBURG, CULPEPER, STAUNTON, AND NORTHERN VIRGINIA DISTRICTS (SEE NOTE 5)

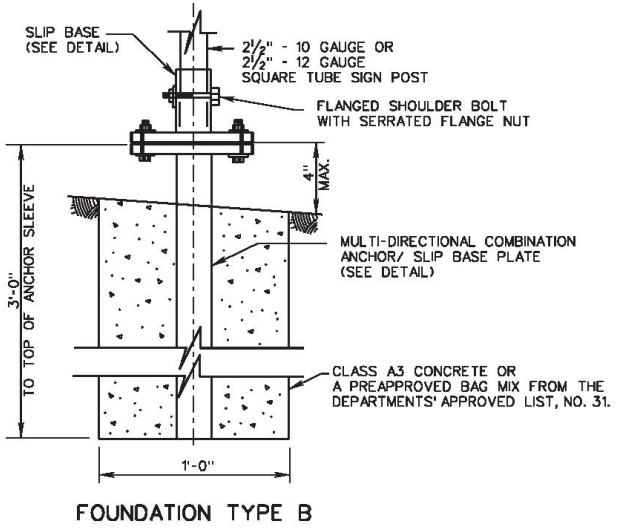
SIZE OF POST	CENTROID (FT)	MAXIMUM AREA (TOTAL OF SIGN PANELS) (FT^2) SINGLE-POST	TWO-POST	THREE-POST	COMMENTS
2 INCH 14 GA.	8	10.7	21.4		TYPE A, TYPE D, OR TYPE F FOUNDATION AS SPECIFIED IN THE CONTRACT DOCUMENTS.
	9	9.5	19.0		
	10	8.5	17.0		
	11	7.7	15.4		
	12	7.1	14.2		
	13	6.5	13.0		
	14	6.1	12.2		
2½ INCH 12 GA.	8	21.5			TYPE A OR TYPE E FOUNDATION.
	9	19.1			
	10	17.2			
	11	15.6			
	12	14.3			
	13	13.2			
	14	12.3			
2½ INCH 10 GA.	8	24.8	49.6	74.4	TYPE B OR TYPE C FOUNDATION AS SPECIFIED IN THE CONTRACT DOCUMENTS.
	9	22.0	44.0	66.0	
	10	19.8	39.6	59.4	
	11	18.0	36.0	54.0	
	12	16.5	33.0	49.5	
	13	15.2	30.4	45.6	
	14	14.1	28.2	42.3	
2½ INCH 10 GA. WITH 2⅜ INCH 10 GA. INNER POST (SEE NOTE 1)	8	43.4	86.8	130.2	TYPE B OR TYPE C FOUNDATION AS SPECIFIED IN THE CONTRACT DOCUMENTS.
	9	38.6	77.2	115.8	
	10	34.7	69.4	104.1	
	11	31.6	63.2	94.8	
	12	28.9	57.8	86.7	
	13	26.7	53.4	80.1	
	14	24.8	49.6	74.4	

STP-1 Square Tube Sign Post: Design Table

- Options not listed in the design table are not permitted. Examples:
  - Four-Post installations
  - 2.5” 12-GA Two-Post and Three-Post
- More cost effective to use a different sign post type

STP-1 Square Tube Sign Post Standard Updates: Foundations

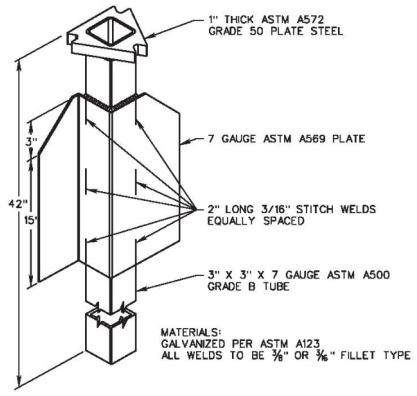
- Foundation types with letter designation A through F
- Designer to determine type based upon the option selected (follow district preferences for smaller sign sizes that do not require a Slip-Base)
- Type A and Type B allow for preapproved bag mix instead of Class A3 concrete



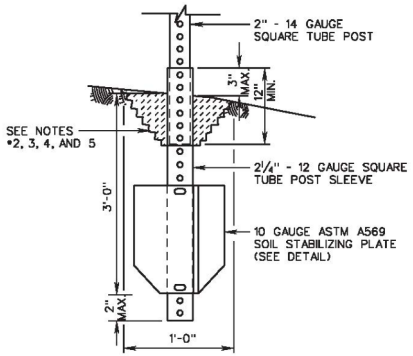
FOUNDATION TYPE B

STP-1 Square Tube Sign Post Standard Updates: Foundations

- Type C foundation is direct driven
- Type D, E, and F foundations allow for cementitious material
- Soil plate is not ideal for all locations



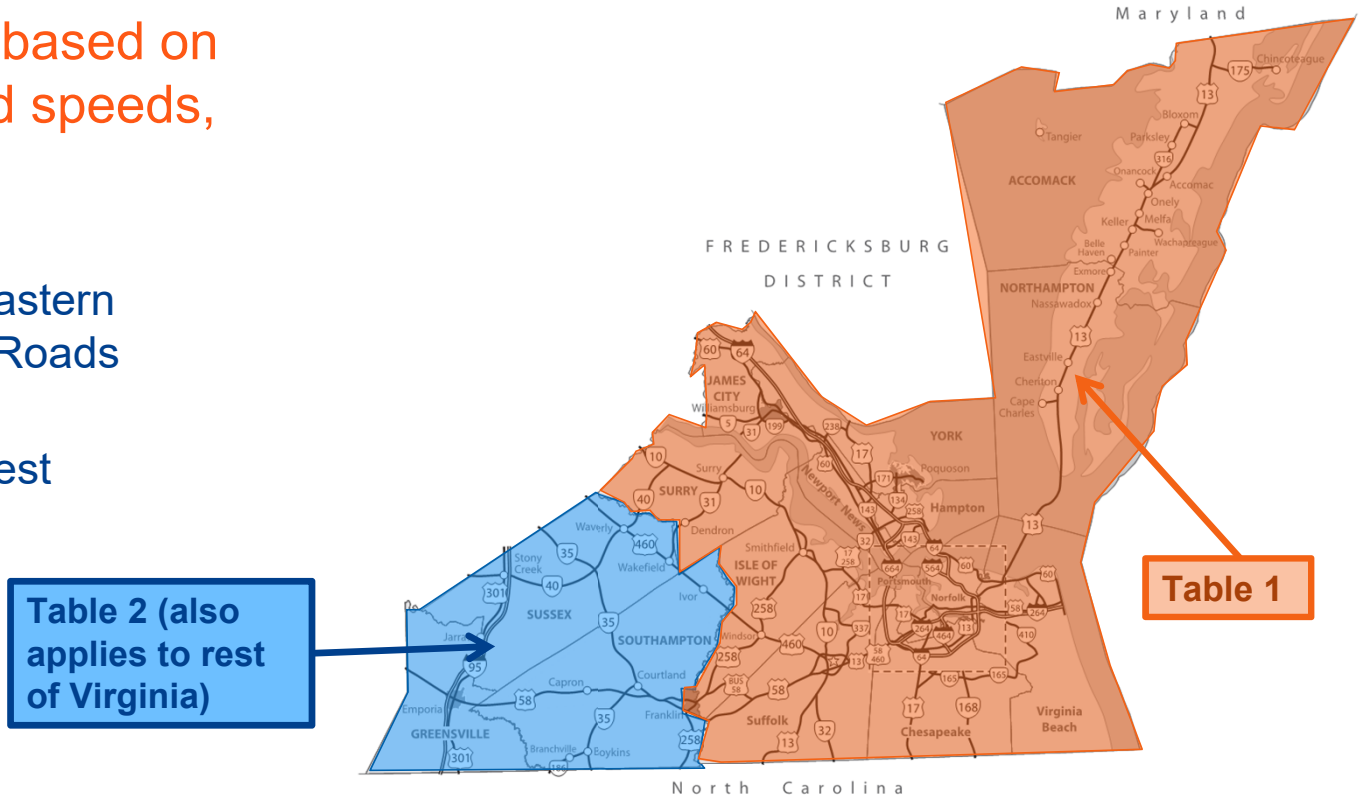
FOUNDATION TYPE C



FOUNDATION TYPE F

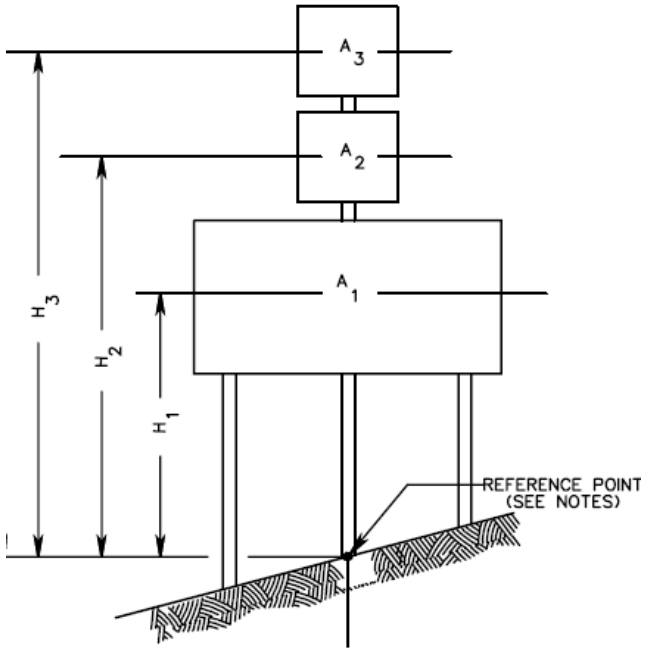
STP-1 Square Tube Sign Post Design Tables

- There are two tables based on AASHTO design wind speeds, experience, and risk considerations:
  - Design Table 1: for eastern portions of Hampton Roads District
  - Design Table 2: the rest of Virginia



STP-1 Square Tube Sign Post: Design Table

- The Basics - how to use the design tables
  - Step 1: Determine centroid and sign panel area:
    a) The sign mounting height (see table on sheet 1 of 12)
    b) Calculate the centroid. See PCS-1 (1319.10)
    c) Calculate the total sign panel area for all signs to be located on sign assembly
  - Step 2: Select which of the two tables to use based on geography.



STP-1 Square Tube Sign Post: Design Table

- Step 3: Determine post size and foundation type
  a) Start with smaller post.
  b) Locate calculated centroid and find sign panel area maximum
  c) If the calculated sign panel area is less than maximum for a single post, then use that size post and foundation type
  d) If the calculated sign panel area is larger than maximum area allowed for the single post, proceed to next larger size of post and repeat steps b and c.
  e) If the calculated sign panel area is larger than the maximum area allowed for a single sign post for all sizes, repeat steps a through d for 2-post and 3-post options.

CENTROID (FT)	MAXIMUM AREA (TOTAL OF SIGN	
	SINGLE-POST	TWO-POST
8	10.7	21.4
9	9.5	19.0
10	8.5	17.0
11	7.7	15.4
12	7.1	14.2
13	6.5	13.0
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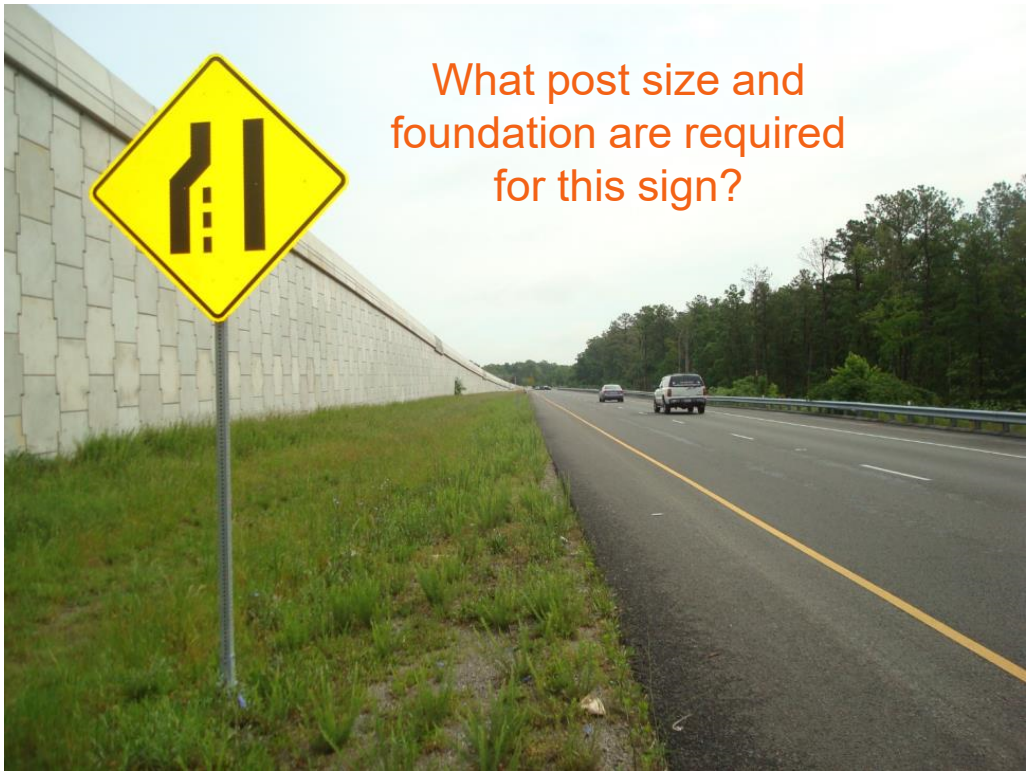
STP-1 Square Tube Sign Post Standard Updates: Example Design Table Problem



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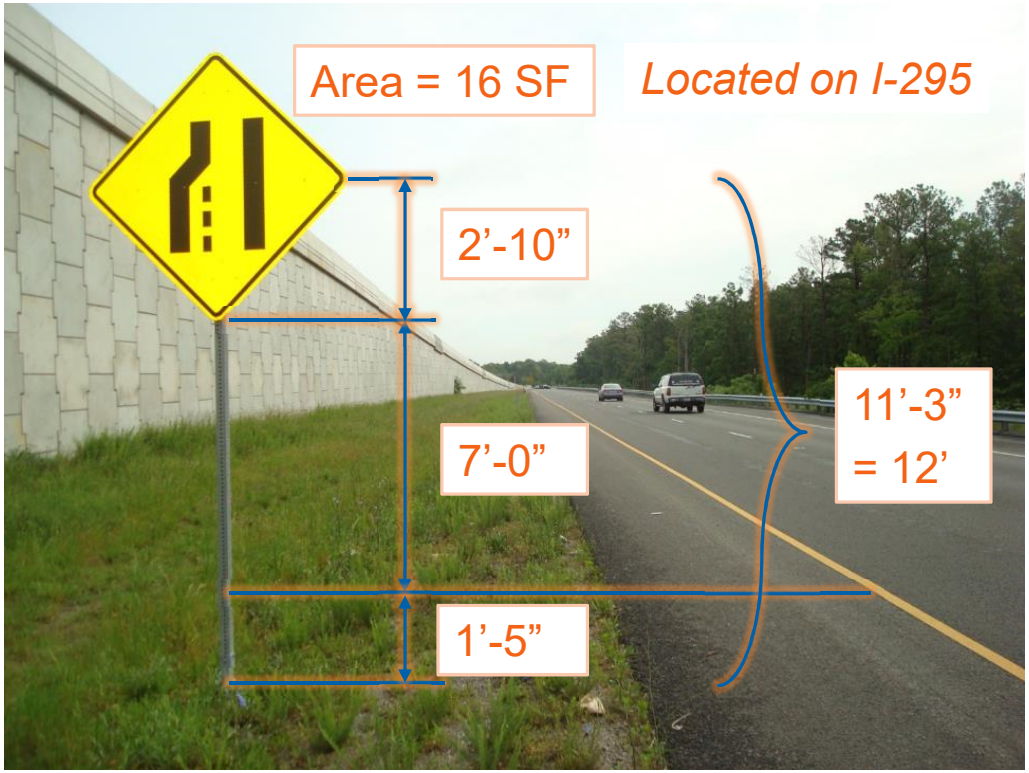

STP-1 Square Tube Sign Post Standard Updates: Example Design Table Problem

- Centroid (H) = (A1 x H1) / A1 = (16 sf x 12 ft) / 16 sf = 12 ft
- Therefore, a 2 ½ inch 10 GA. Post with a Type B or C foundation is required.

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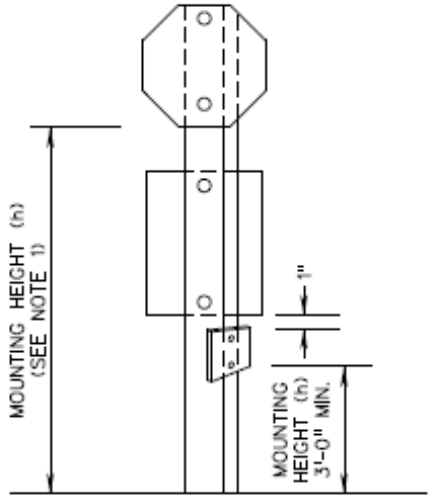
ISD-1 Interchange Exit Ramp Signing Details: Mounting Heights of Sign Installation

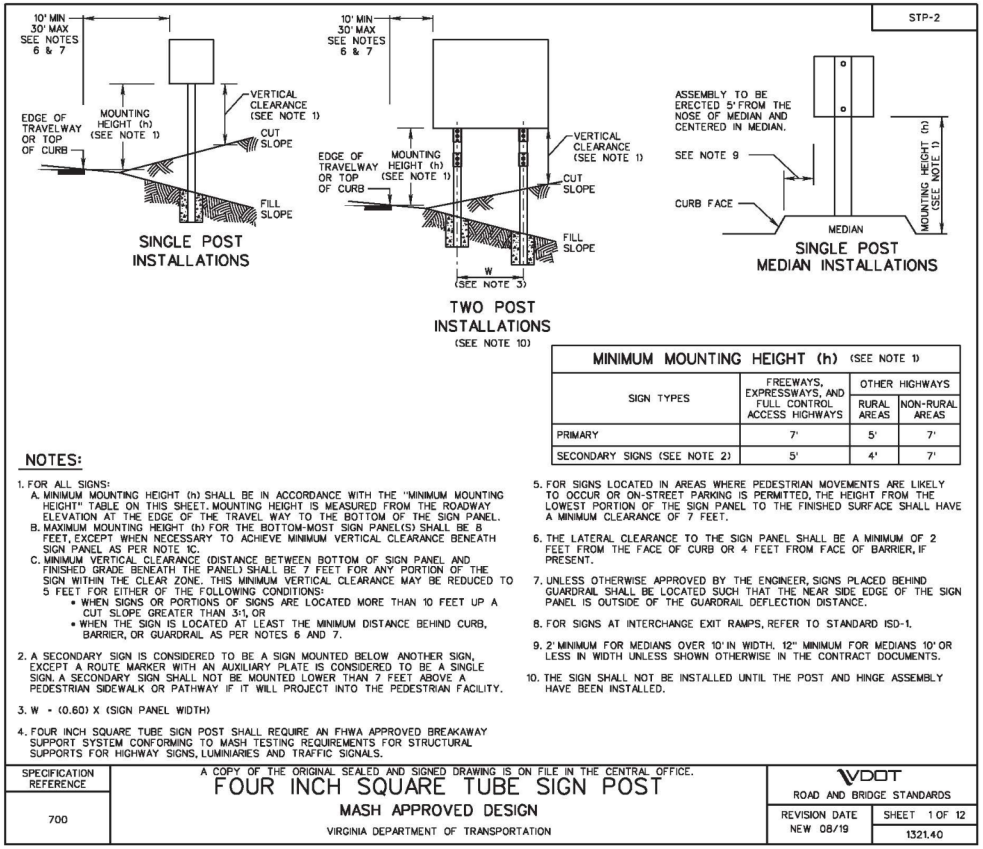
- Details previously included in the STP-1, but now a standalone standard
- Signing at exit ramps have 3’-0” mounting height (Do Not Enter, Wrong Way, and One Way signs)
- Recommended that designers call out reduced mounting heights on plans



STOP OR YIELD SIGNS AND
DO NOT ENTER SIGN
(AT EXIT RAMPS ONLY)

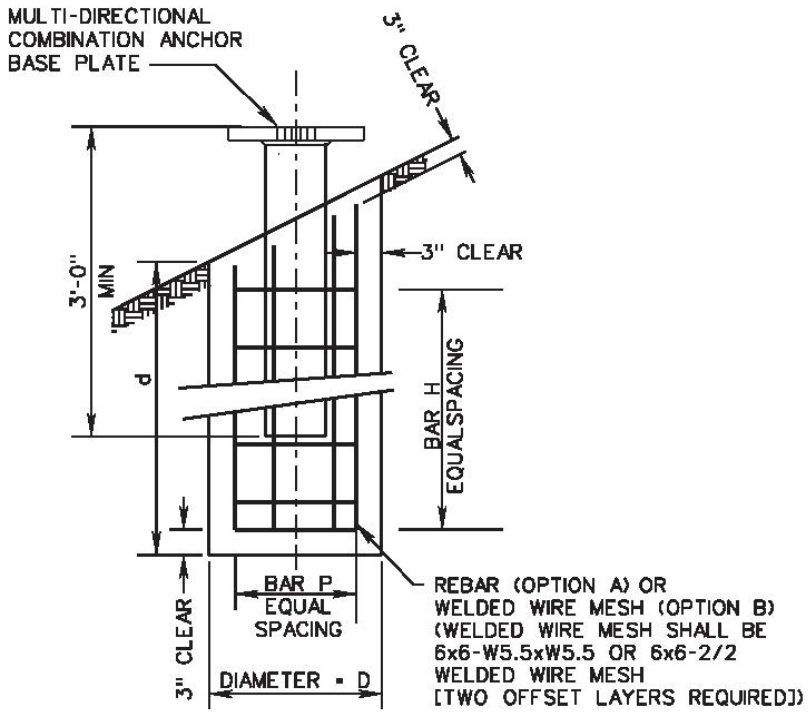
STP-2 (4-inch) Square Tube Sign Post

- Sign post size is a standard 4” square tube
- Placement details similar to STP-1
- Can accommodate large sign panels compared to STP-1
- Sign post size does not change based on centroid and number of posts required.
- Compared to STP-1, STP-2 detail has an increased maximum centroid (14 ft vs. 18 ft) and sign area (130 ft^2 vs 200 ft^2).



STP-2 (4-inch) Square Tube Sign Post

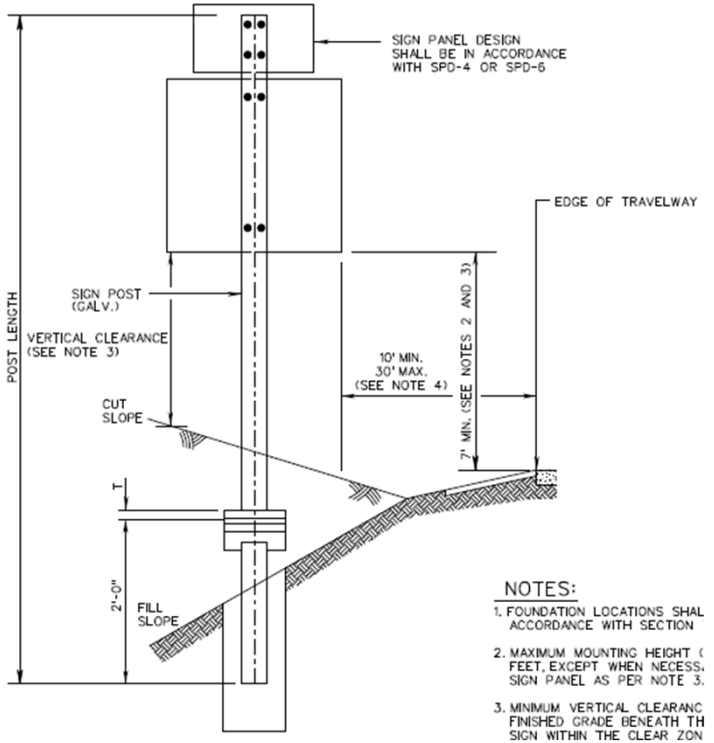
- STP-2 detail has a single concrete foundation type, dimensions and reinforcement vary based on centroid and sign area.
- Concrete for the foundation can be either Class A3 or preapproved bag mix.
- Single-post STP-2 is preferred for larger gore exit signs



ELEVATION

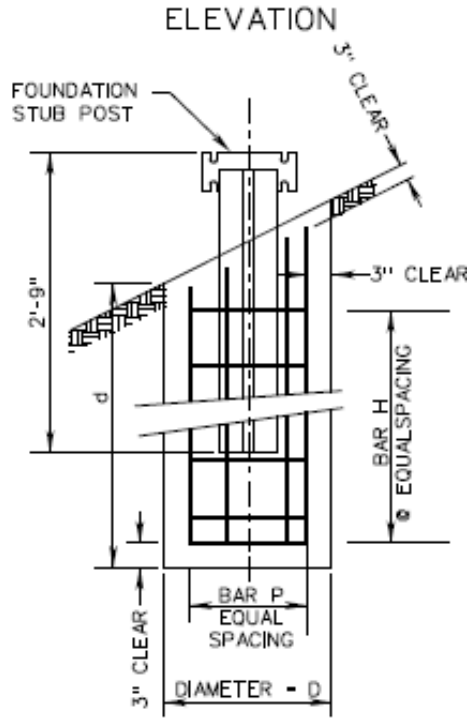
SSP-VA and SSP-VIA: Placement

- Mounting height revisions similar to STP revisions
- Lateral placement:
  - Minimum is 10’
  - Maximum is 30’
- If behind guardrail, the edge of sign shall be beyond the guardrail deflection distance



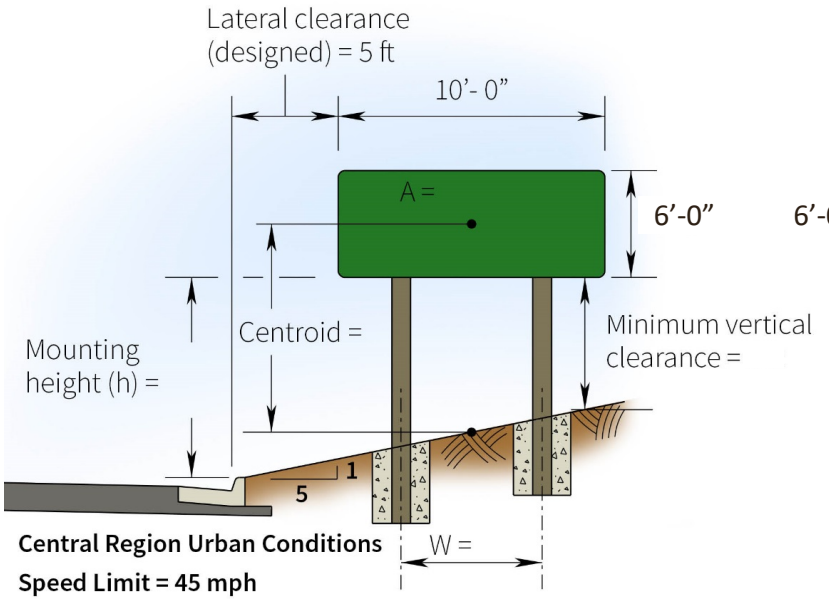
SSP-VA and SSP-VIA Pay Item Updates

- Sign post (LF) must also include the stub post length
- VA stub post length = 2’-0” (old length was 1’-8”)
- VIA stub post length = 2’-9”
- Post lengths in the standards are ONLY for estimating
- Contractor’s responsibility to verify post length based on finished grade



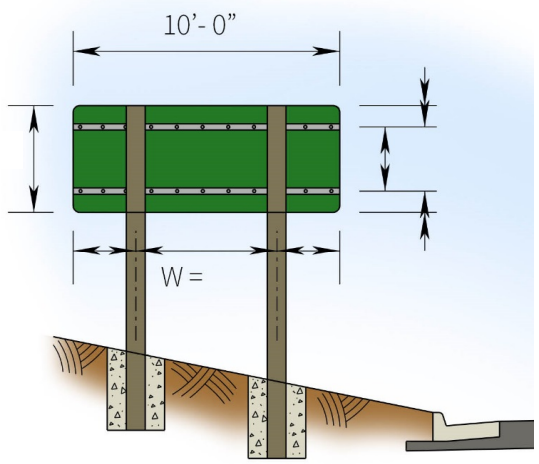
VIA Foundation

Example Calculation for STP -2 Sign Posts



Central Region Urban Conditions
Speed Limit = 45 mph
Clearzone = 20 ft
Minimum Lateral Clearance =

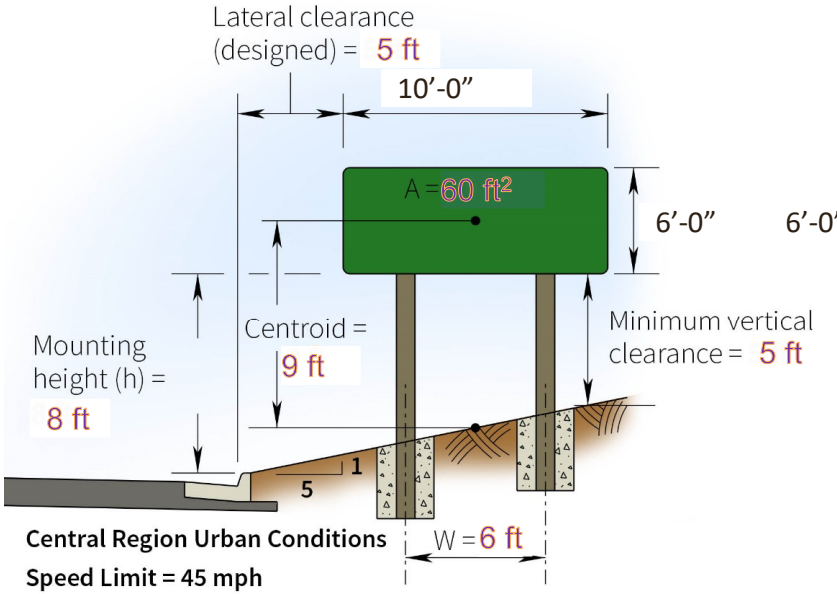
Front View



Back View

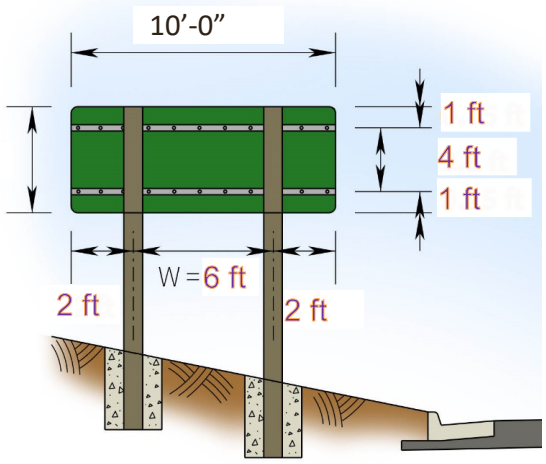
1. Complete the Calculations above.
2. Determine the following:
   STP post size =
   STP foundation type =
3. Will the **minimum mounting height** or **minimum vertical clearance** need to be increased to meet the other requirement?
4. Does the lateral clearance meet requirements?
5. Determine the bracing spacing.
6. Is extra bracing required?

Example Calculation Answers



Central Region Urban Conditions
Speed Limit = 45 mph
Clearzone = 20 ft
Minimum Lateral Clearance = 2 ft

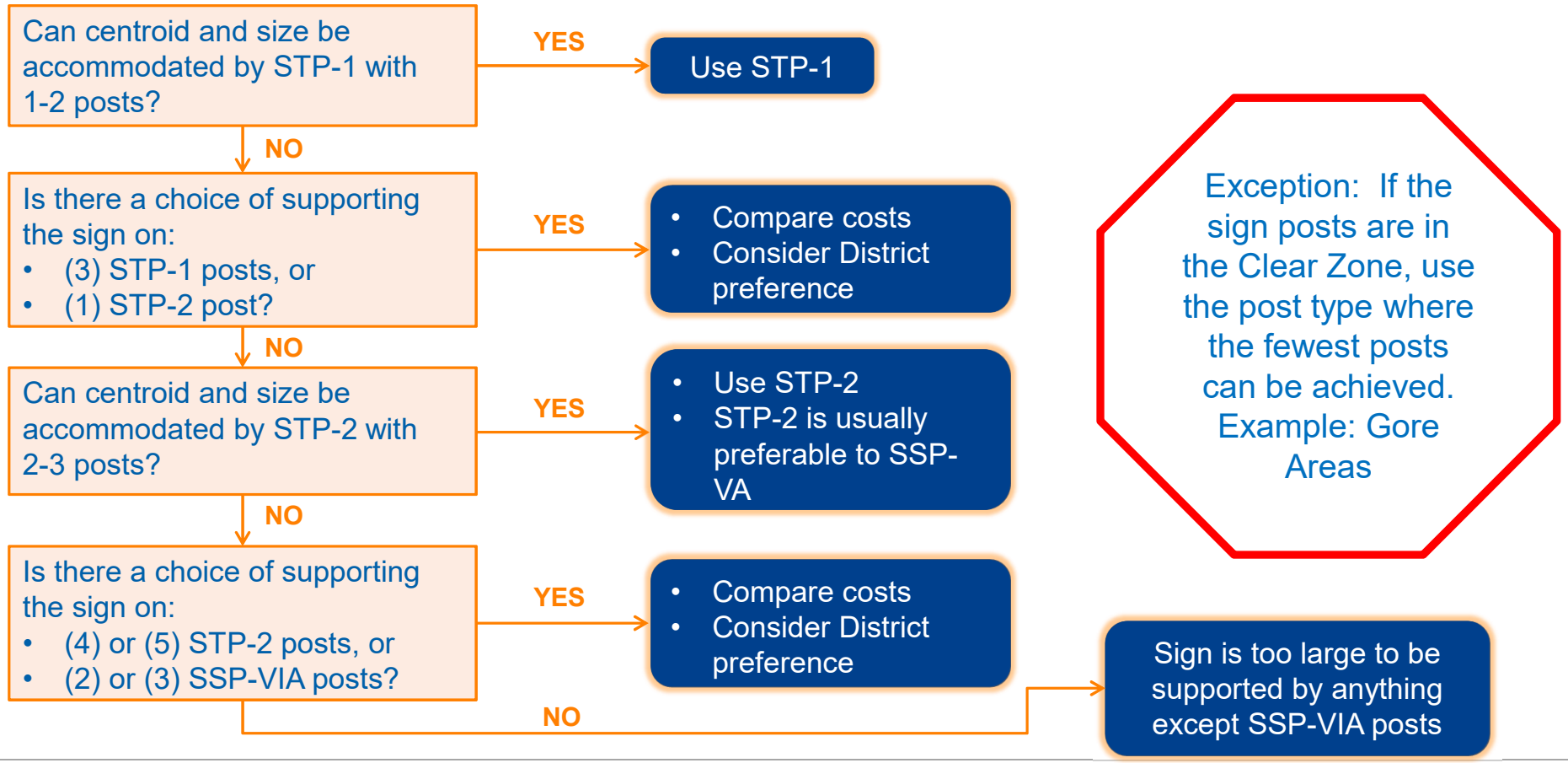
Front View



Back View

1. Complete the Calculations above.
2. Determine the following:
   STP post size = 4” 8 gauge
   STP foundation type = Type C
3. Will the **minimum mounting height** or **minimum vertical clearance** need to be increased to meet the other requirement? Minimum mounting height
4. Does the lateral clearance meet requirements? Yes
5. Determine the bracing spacing. Vertical Bracing – 1’, 2’, 2’, 1’
6. Is extra bracing required? Yes

Selecting the Appropriate Sign Post – Rule of Thumb



Temporary Sign Posts (WSP-1)

- Allows wood or square tube posts for temporary (3 years or less) applications
- Similar but not identical to the STP standards
- Noted differences between STP (permanent) and WSP (temporary)

WSP-1 includes:

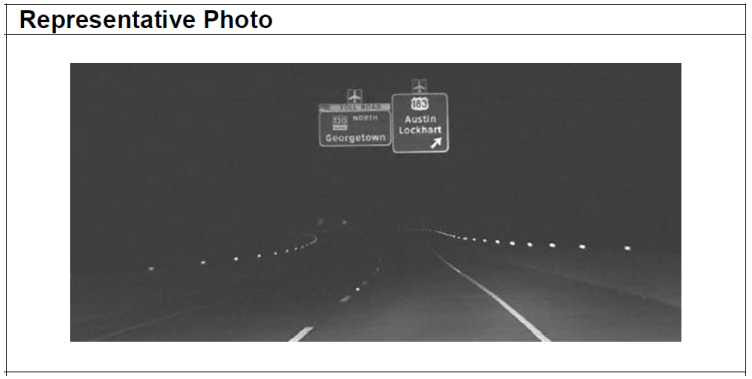
- Use of wood posts (includes design table)
- One statewide design table
- Square tube posts may be spliced
- Posts may extend up to 2’ beyond top edge of sign
- Contractor to determine foundation type

Overhead Sign Lighting Instructional and Information Memorandum (IIM-TE-380.1)

- VDOT's default position is "no sign lighting"
  - sign lighting shall not be provided except where justified as per the IIM
- Ending the practice of designing structures to consider future addition of sign lighting
- LEDs shall be used for all sign lighting luminaires
- Luminaire Retrieval Systems should not be used, except where determined necessary on case-by-case basis
- When an existing sign panel is replaced, existing sign lighting shall be evaluated for potential decommissioning (cutting power to the lights)

Overhead Sign Lighting Decision-Making Process

- Factors involved in the evaluation:
  - Visual Complexity Rating (VCR) rating 1-5. Use IIM based on description and representative photos to determine VCR rating.
  - Limited-Access versus non-limited Access Highway
  - Type of sign sheeting (Type III, Type IX or Type XI)
  - Unencumbered Sight Distance (USD)
- Use tables in IIM to determine if overhead sign lighting is required.
- Some exceptions, including Afton Mountain and Fancy Gap Mountain fog areas (lighting required).
- Sign lighting is now a separate pay item; no longer incidental to the OSS



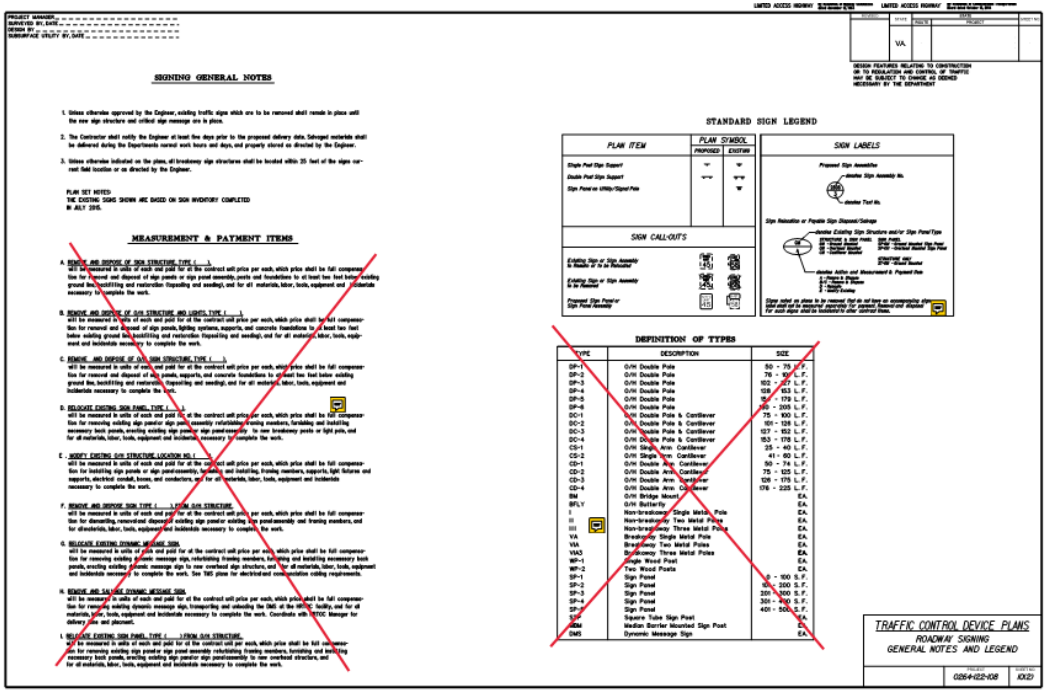
Example of Level 1 Complexity from IIM-TE-380.1

Sign Removal Supplemental Specification

- Supplemental specifications include additional information for sign removal and sign relocation

- Pay items for: **Remove Existing (Type) Sign Structure, Remove Existing (Type) Sign Panel and Relocate Existing (Type) Sign Panel.**

- Pay items will be measured in units of each and paid for at the Contract each price for the type of structure specified.


SIGNING GENERAL NOTES

MEASUREMENT & PAYMENT ITEMS

STANDARD SIGN LEGEND

PLAN ITEM

PLAN SYMBOL

PROPOSED

EXISTING

SIGN LABELS

SIGN CALL-OUTS

DEFINITION OF TYPES

TYPE

DESCRIPTION

SIZE

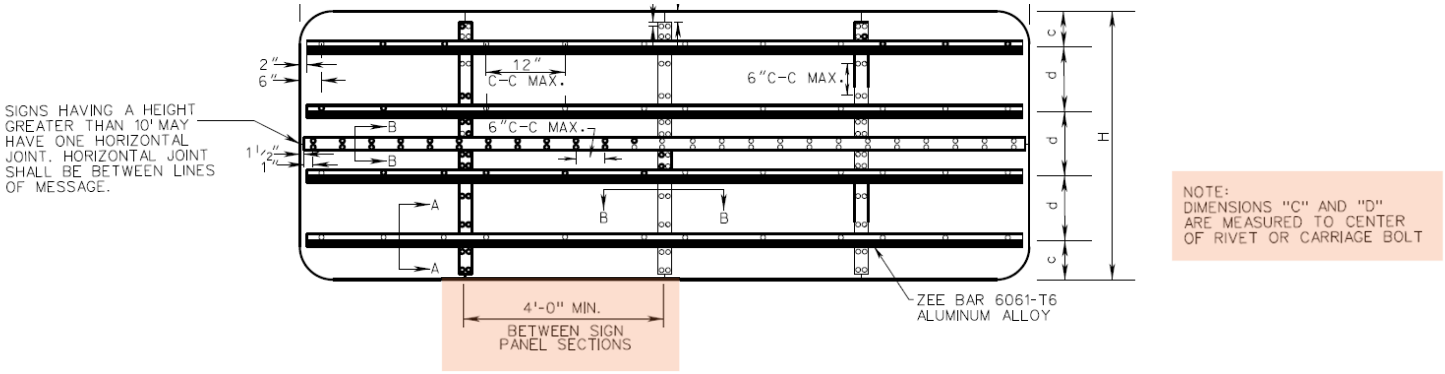
TRAFFIC CONTROL DEVICE PLANS

ROADWAY SIGNING

GENERAL NOTES AND LEGEND

Other Sign-Related Items

- Breakaway support systems shall not be used for poles that support electrical power service equipment.
- Details for Temporary signs were revised August 2017.
- SPD-1 sign panel design details were revised September 2018. 4’-0” is now the required minimum between sign panel sections. Note added that dimensions for ‘c’ and ‘d’ are measured to center of rivet or carriage bolt.



Questions/Discussion